

*REMARKS/ARGUMENTS**The Pending Claims*

Claims 1-4 and 7-23 currently are pending. Claims 1-4 and 7-21 are directed toward a polishing pad. Claims 22 and 23 are directed toward a method of polishing with the aforementioned polishing pad. Reconsideration of the claims is respectfully requested in view of the remarks herein.

Summary of the Office Action

Claims 1 and 7-23 stand rejected under 35 U.S.C. § 102(b) as allegedly anticipated by U.S. Patent Application Publication 2003/0190864 A1 (Lehman et al.) (hereinafter “the Lehman publication”). Claims 2-4 stand rejected under 35 U.S.C. § 103(a) as allegedly obvious over the Lehman publication in view of U.S. Patent 6,168,508 B1 (Nagahara et al.) (hereinafter “the Nagahara patent”).

Discussion of the Anticipation Rejection

The Lehman publication allegedly discloses a chemical-mechanical polishing pad comprising a polishing layer and including an endpoint detection port, a hydrophilic region, and a hydrophobic region that is adjacent to the endpoint detection port and completely surrounds that port. However, the Lehman publication fails to disclose a hydrophobic region comprising a polymeric material having a surface energy of 34 mN/m or less as required by the pending claims. Thus, the Lehman publication cannot properly be considered to anticipate the subject matter of the pending claims.

The Office Action asserts that membrane 194 corresponds to a hydrophobic region, polishing pad 184 with polishing surface 188 corresponds to a hydrophilic region, and window 182 corresponds to an endpoint detection port (Office Action, pages 2-3). The Lehman publication discloses suitable materials for each of membrane 194, polishing pad 184, and window 182. For example, the Lehman publication teaches *one* type of polymer suitable for forming polishing pads, namely polyurethane (para. 0083). Likewise, the *only* material that is disclosed as suitable for the membrane 194 is also polyurethane (para. 0096). Contrary to the assertions in the Office Action, the Lehman publication does not teach that

polybutadienes, polyethylenes, polystyrenes, and combinations thereof can be used for membrane 194, i.e., the alleged hydrophobic region; rather, the Lehman publication teaches that the aforesaid polymers are suitable for the window 182, i.e., the endpoint detection port (para. 0088-0091). Thus, the Lehman reference teaches that polishing pad 184 and membrane 194 are made of polyurethane.

Despite the fact the alleged hydrophobic region and the alleged hydrophilic region both comprise the same material, i.e., polyurethane, the Office Action asserts that the hydrophobic region “can inherently be formed to have a surface energy of 34 mN/m or less depending upon the application” while the hydrophilic region “being formed from polyurethane ... can inherently be formed to have a surface energy of 34 nM/m or more depending upon the application.”

In order for an anticipation rejection based on inherency of a certain characteristic to be proper, the “extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill in the art.” M.P.E.P § 2112. It is the examiner’s duty to “provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art.” M.P.E.P § 2112. In this case, since the Lehman reference teaches that both membrane 194 and polishing pad 184 are made of polyurethane, it is impossible that a surface energy of 34 nM/m or less *and* a surface energy of 34 nM/m or more are *necessarily present* in membrane 194 and polishing pad 184, respectively.

Alternatively, the Office Action states:

[p]olyurethane, without further defining details, can be hydrophilic or hydrophobic, and hydrophobic polyurethanes are often used in applications where liquid is present, to fill cracks, or to seal parts to protect them from a fluid. The membrane used in the Lehman publication seals the area around the window to prevent polishing fluid from the getting to the window, therefore the material can be considered hydrophobic, as it will repel the fluid away from the window.

(Office Action, pages 4-5). The Office Action concludes from these remarks that the disclosure of polyurethane, i.e., a potential genus of thousands and thousands of polymers with the same chemical backbone, anticipates the claimed subject matter.

The Office Action's reasoning is flawed. A membrane that functions as a sealant does not necessarily satisfy the claim element "wherein the hydrophobic region comprises a polymeric material having a surface energy of 34 mN/m or less." The surface energy of a material, also known as critical surface tension, is a measure of the wettability of the solid. The surface energy commonly is expressed as the lowest surface tension a liquid can have and still exhibit a contact angle greater than zero degrees on that solid, i.e., the value where the liquid will still form a bead instead of spreading over the surface of the solid. The ability of a solid material, i.e., polyurethane, to form a seal that is impenetrable to a liquid through a certain thickness is not a measure of surface energy as recited in the pending claims and does not necessarily require the material to be hydrophobic or have a surface energy as required in the pending claims.

Thus, the disclosure of membrane 194 comprising polyurethane, regardless of its alleged ability to function as a sealant, fails to teach a hydrophobic region comprising a polymeric material having a surface energy of 34 mN/m or less. As described in the specification, polyurethanes have a surface energy of 34 nM/m or more (para. 0019) and are hydrophilic as defined by the pending claims. It is generally recognized in the art the polyurethanes have higher surface energy values, and polyurethane has a surface energy of 45 nM/m. See D.B. James, "CMP Polishing Pads" (Chapter 6) in *Chemical-Mechanical Planarization of Semiconductor Materials* (Springer, 2004), p. 169. Applicant is unaware of any conventional polyurethanes having a surface energy of 34 nM/m or less.

Therefore, the subject matter of pending claims 1 and 7-23 cannot properly be considered anticipated by the Lehman publication. Applicant respectfully requests that the anticipation rejection of claims 1 and 7-23 be withdrawn.

Discussion of the Obviousness Rejection


The combination of the Lehman publication and the Nagahara patent fails to teach or suggest all of the claim limitations. As discussed above with respect to the anticipation

rejection, the Lehman publication fails to disclose a hydrophobic region adjacent to and completely surrounding an endpoint detection port, wherein the hydrophobic region has a surface energy of 34 mN/m or less. The Nagahara patent fails to cure the deficiencies of the Lehman publication. Because the Lehman publication and the Nagahara patent, both alone and in combination, fail to teach or suggest every element of the pending claims, the obviousness rejection is improper and should be withdrawn.

Conclusion

Applicants respectfully submit that the patent application is in condition for allowance. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,



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